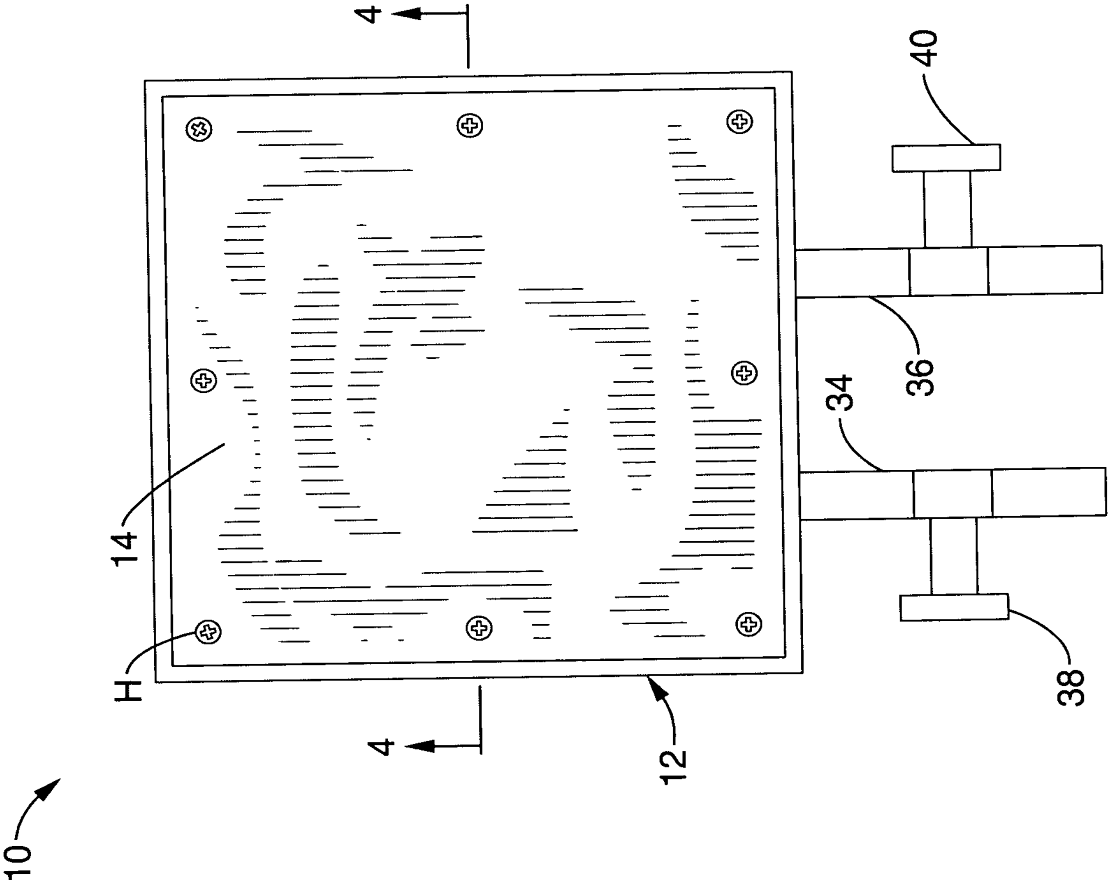

FIG. 1

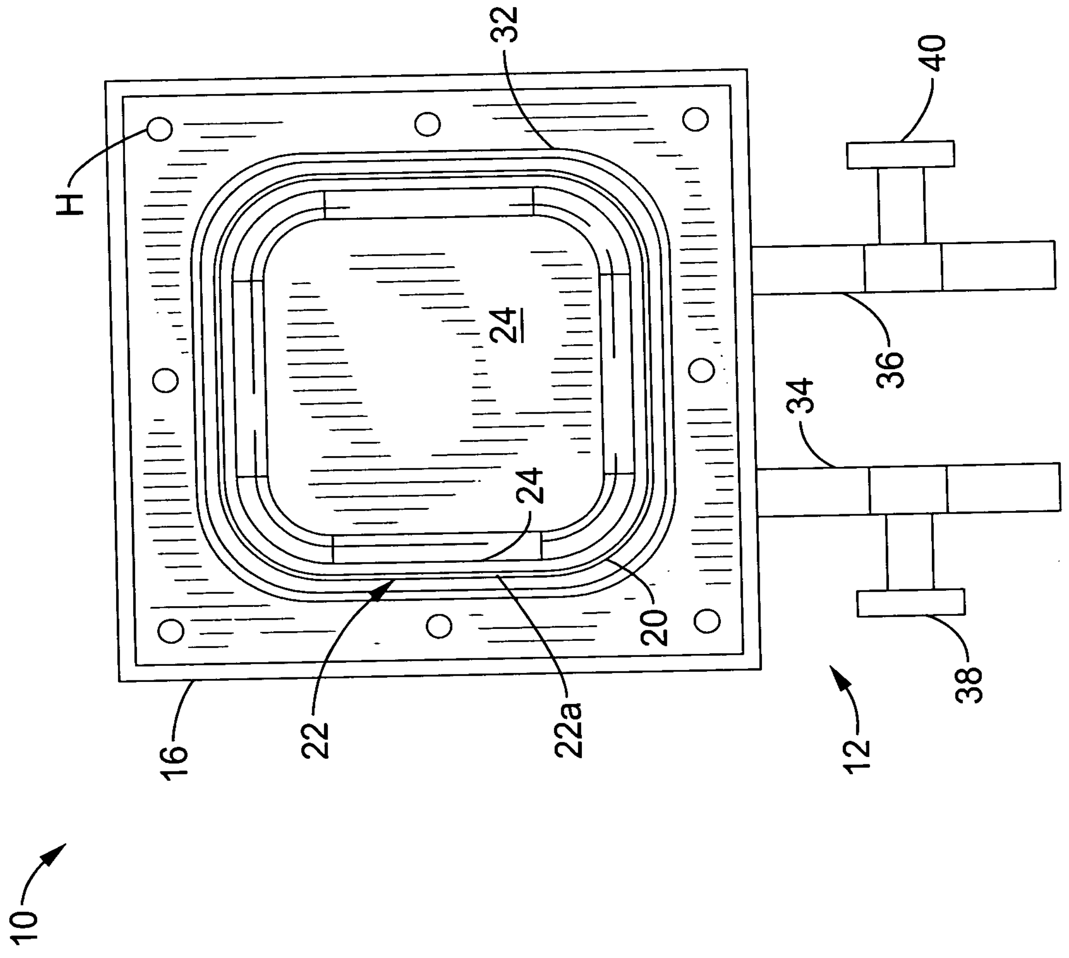

FIG. 2

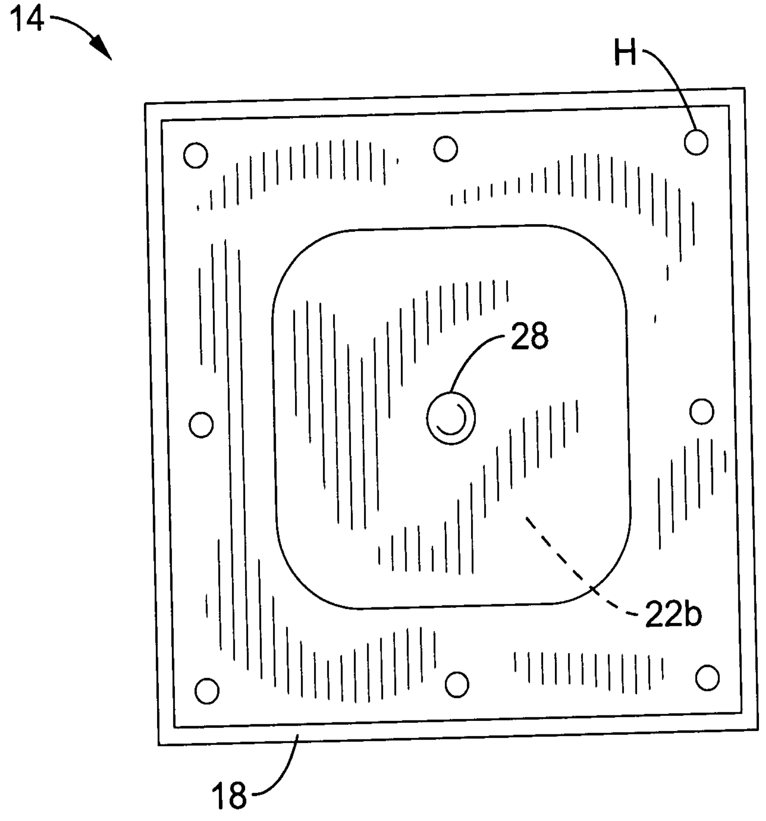

FIG. 3

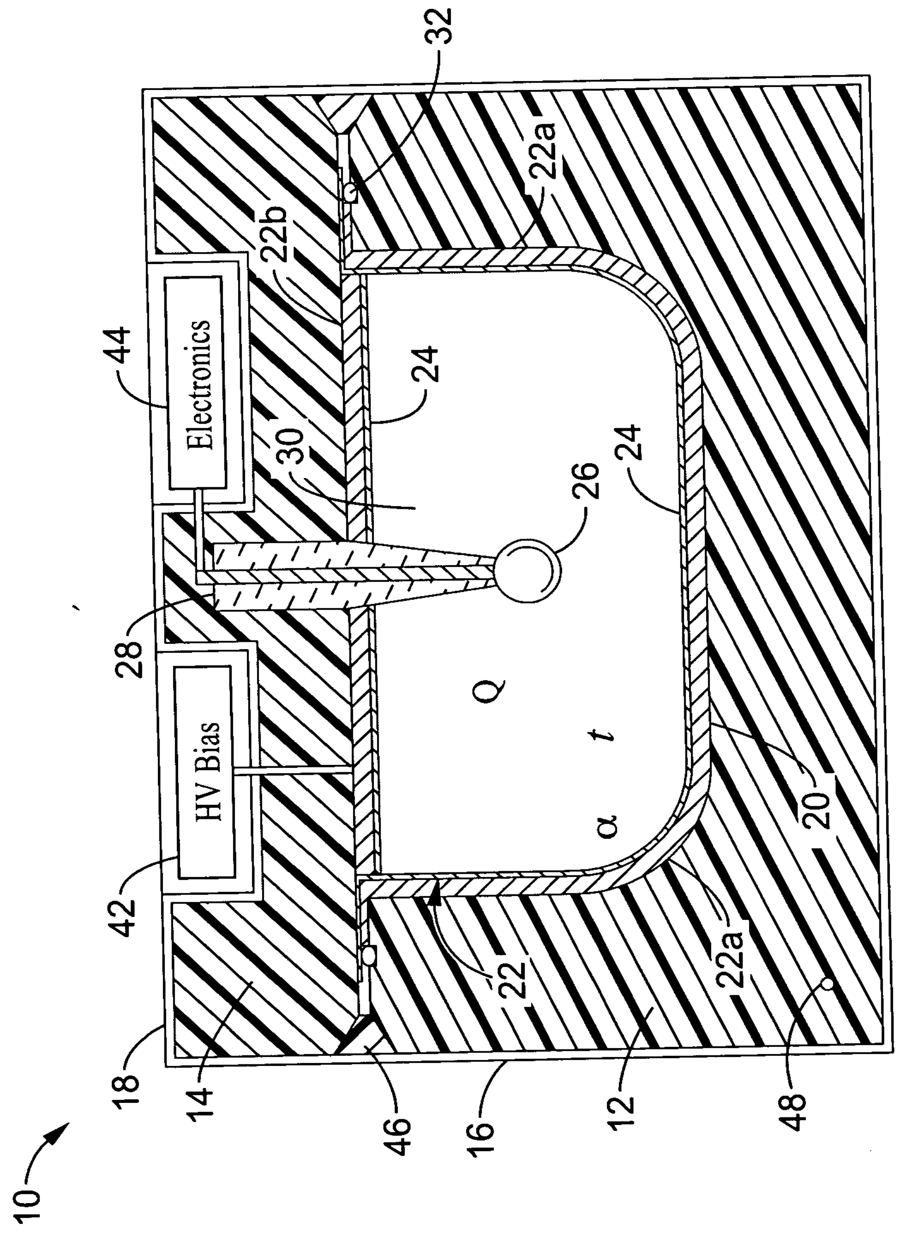
HV Bias
α
t
Q
Electronics

FIG. 4

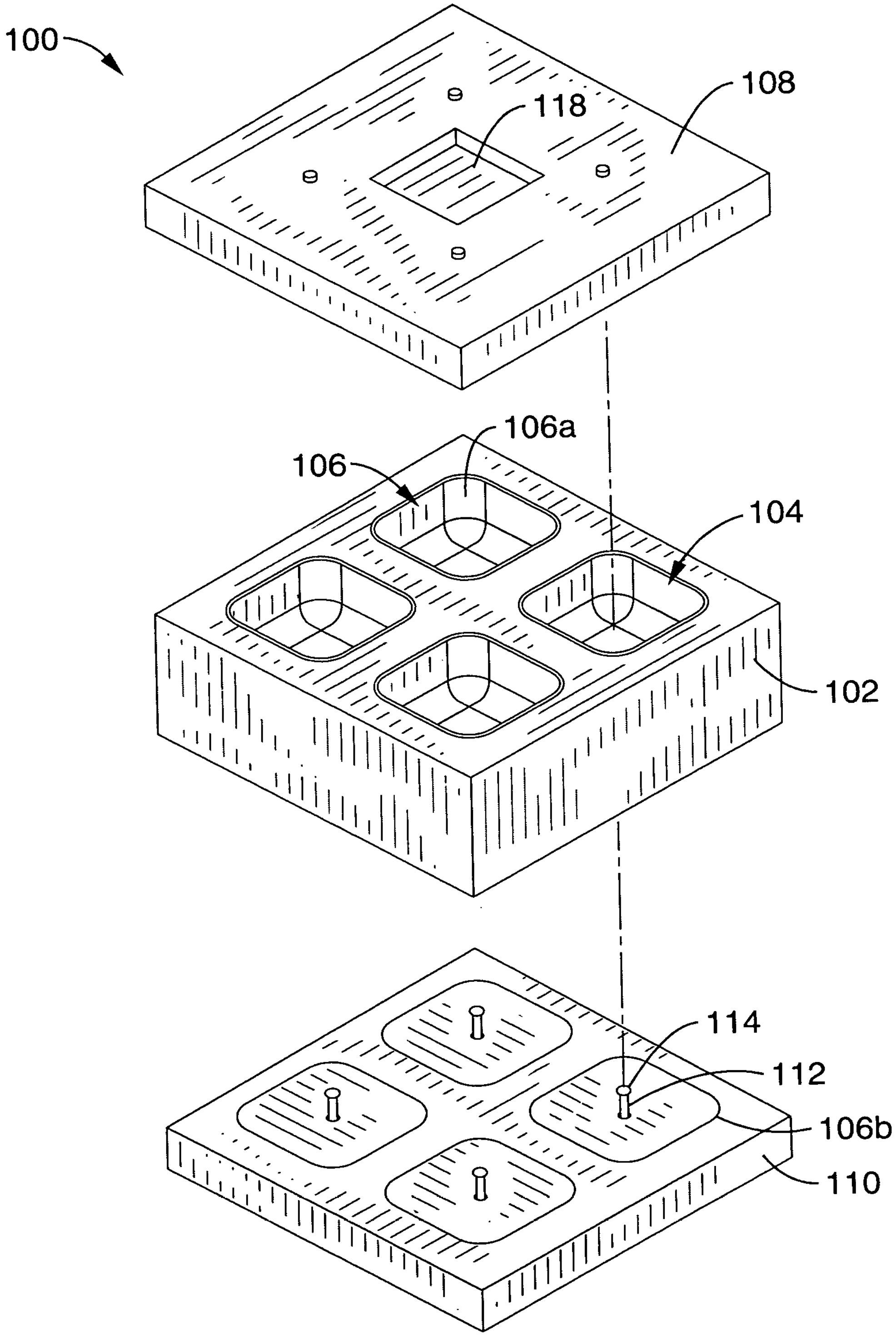

FIG. 5

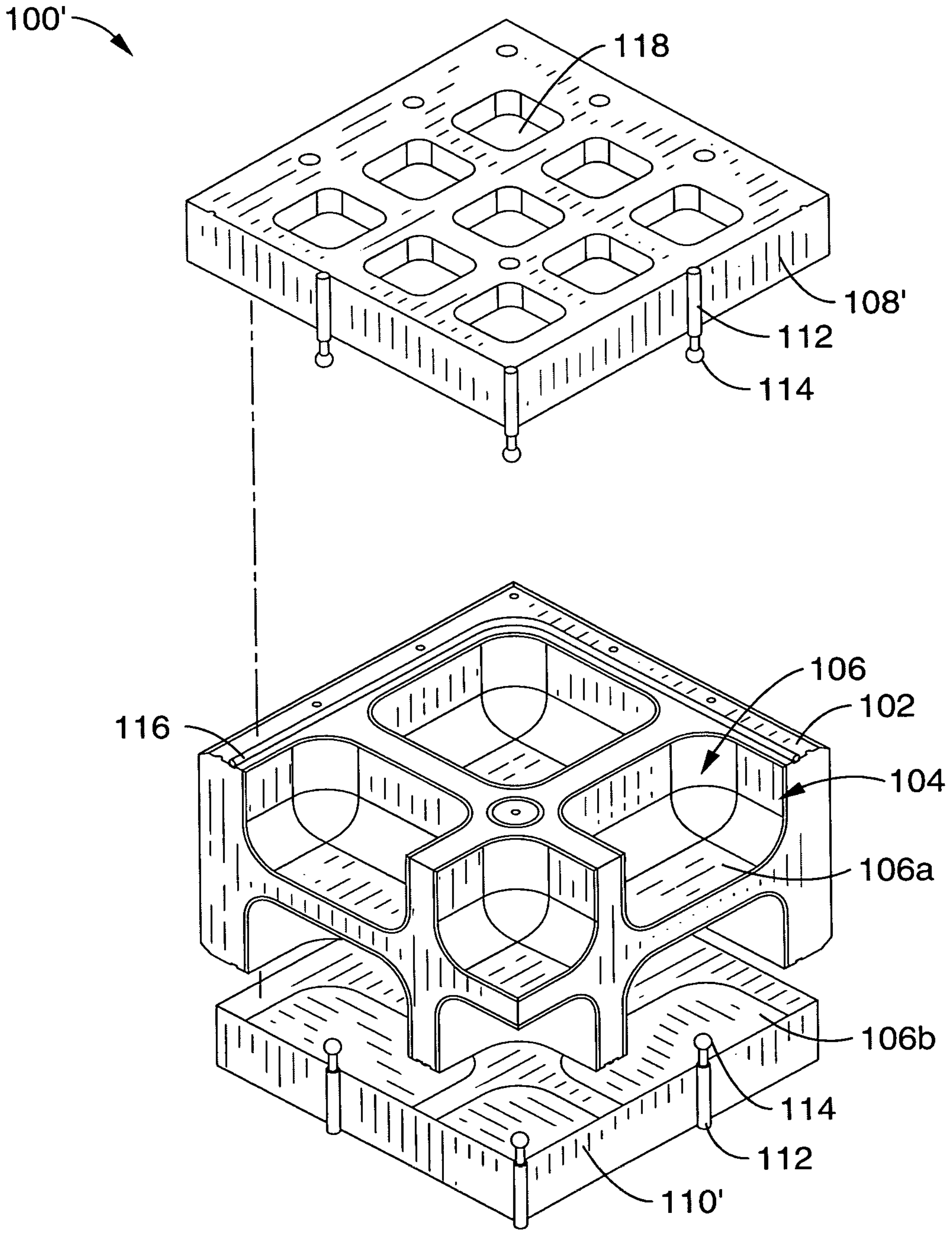

FIG. 6

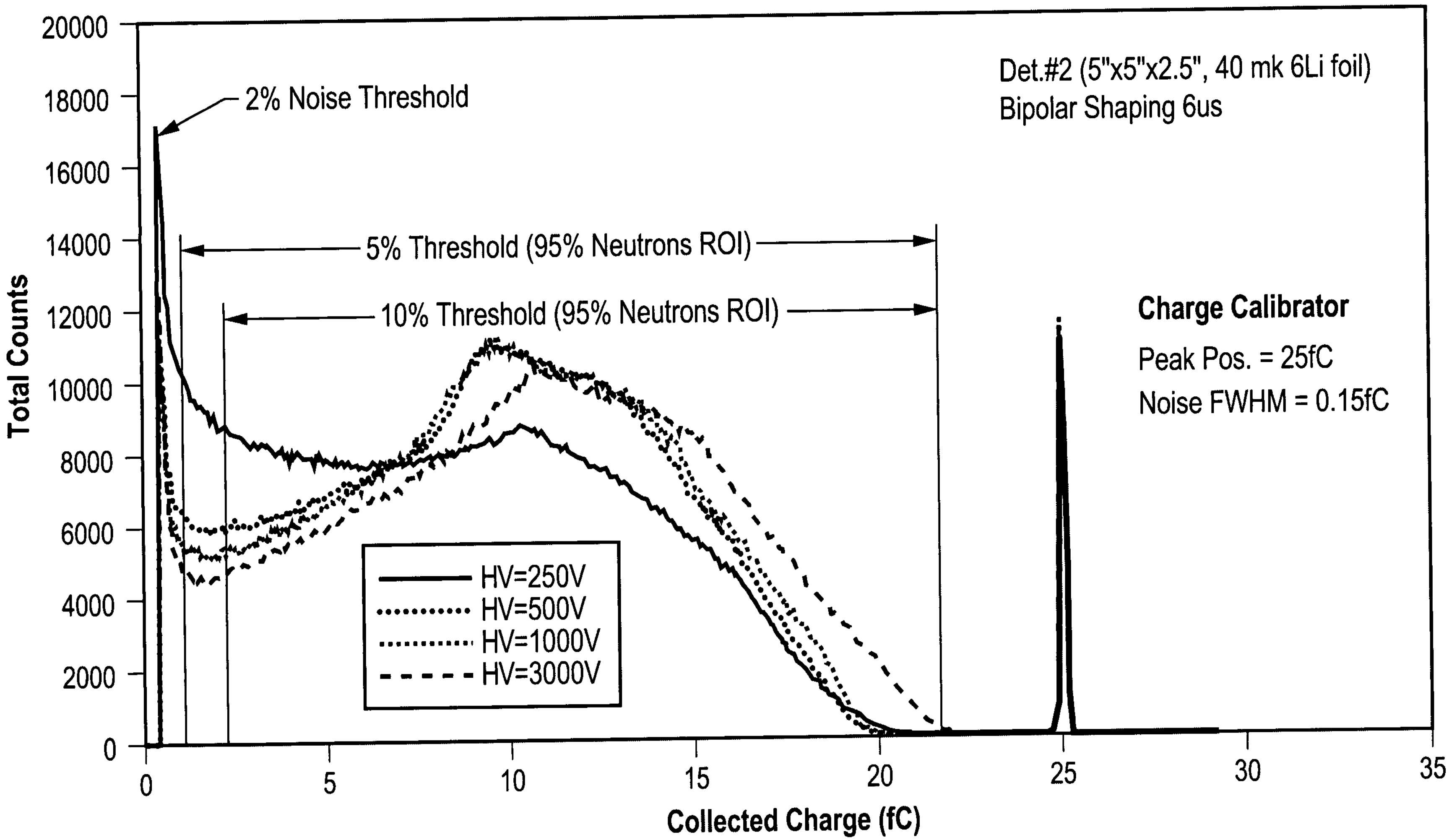
Det.#2 (5"x5"x2.5", 40 mk 6Li foil)
Bipolar Shaping 6us
2% Noise Threshold
5% Threshold (95% Neutrons ROI)
10% Threshold (95% Neutrons ROI)
Charge Calibrator
Peak Pos. = 25fC
Noise FWHM = 0.15fC
HV=250V
HV=500V
HV=1000V
HV=3000V
Total Counts
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0
5
10
15
20
25
30
35
Collected Charge (fC)

FIG. 7

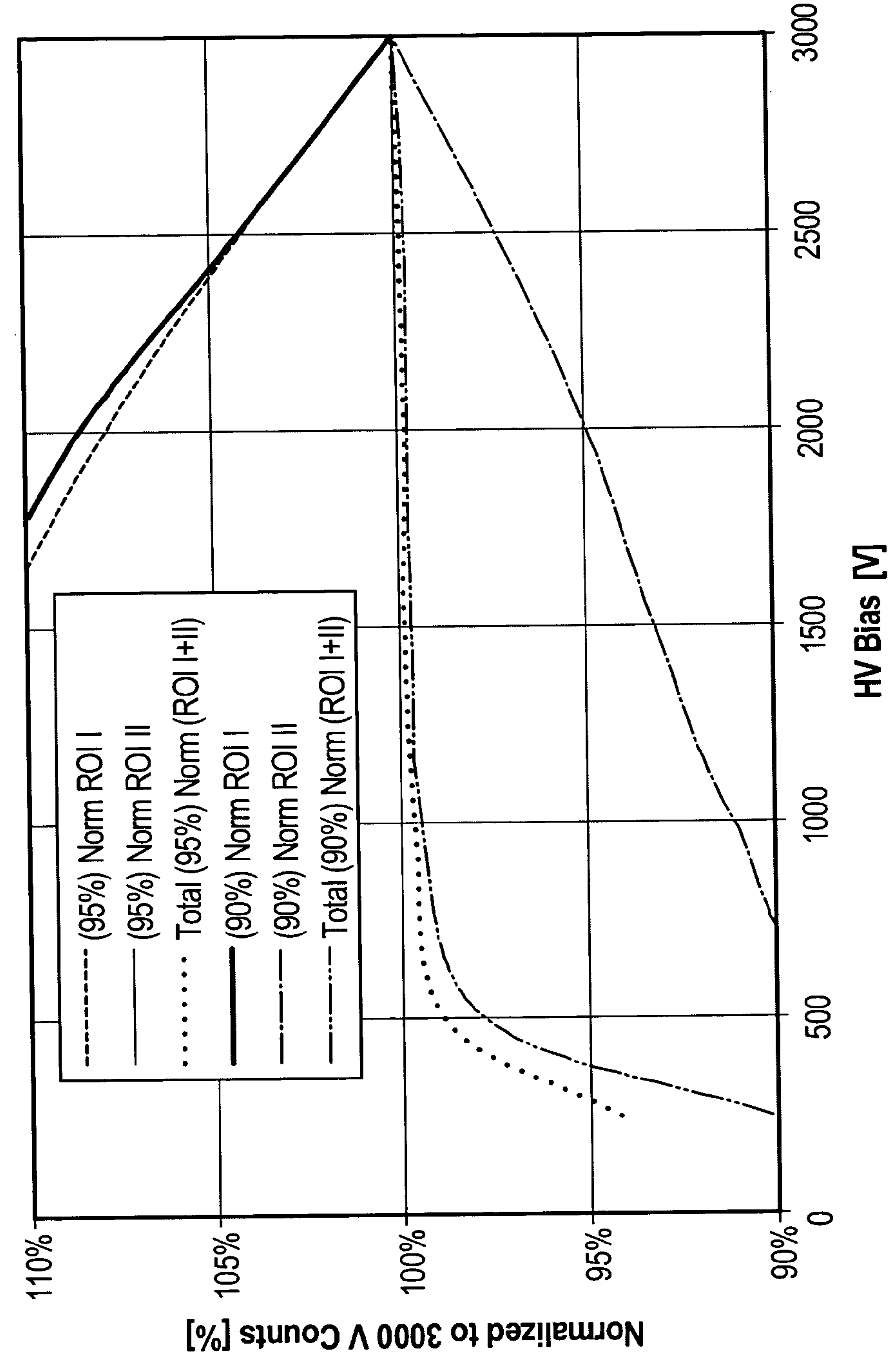
(95%) Norm ROI I
(95%) Norm ROI II
Total (95%) Norm (ROI I+II)
(90%) Norm ROI I
(90%) Norm ROI II
Total (90%) Norm (ROI I+II)
110%
105%
100%
95%
90%
Normalized to 3000 V Counts [%]
0
500
1000
1500
2000
2500
3000
HV Bias [V]

FIG. 8

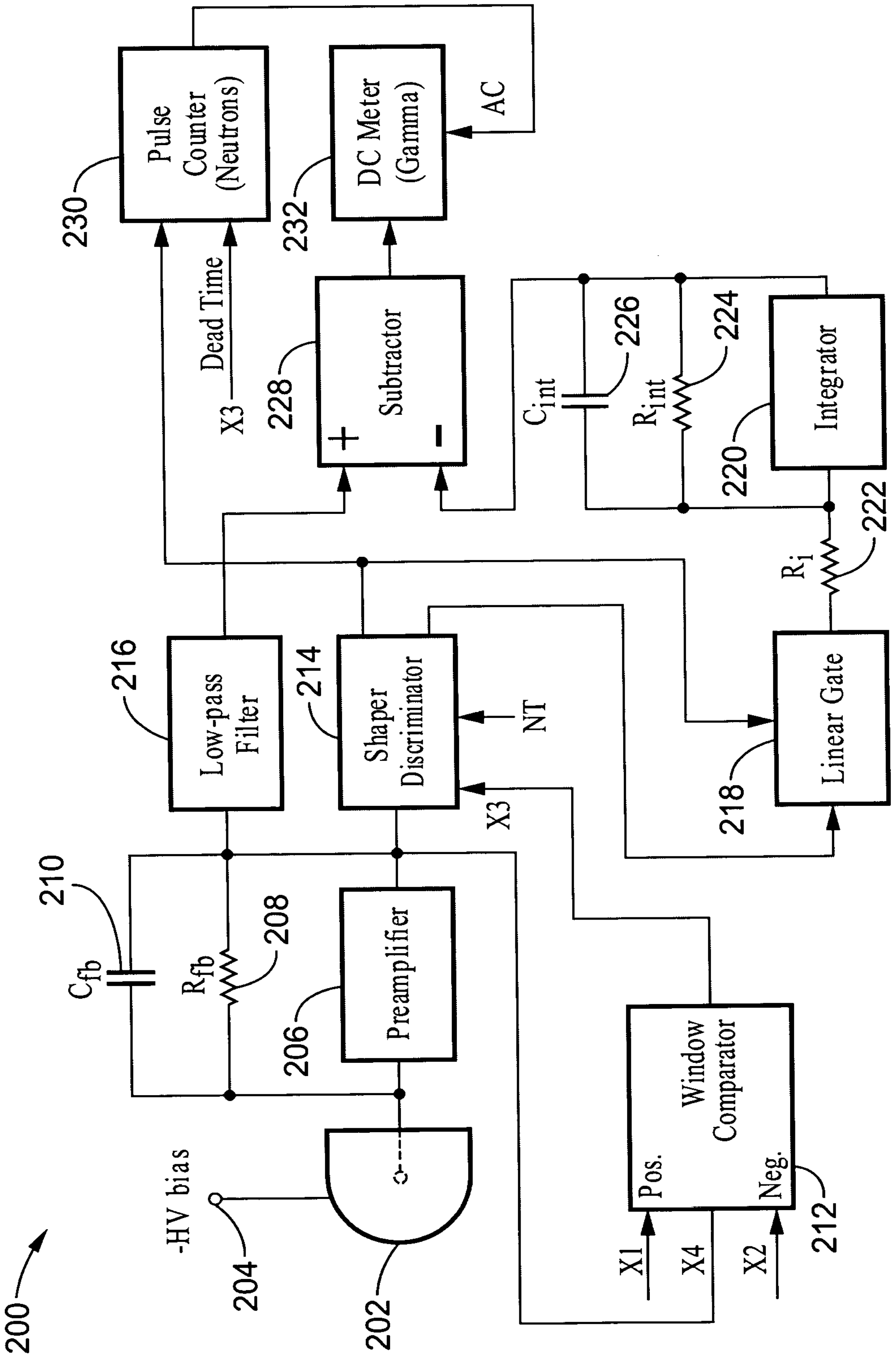
200
-HV bias
204
202
C_{fb}
210
R_{fb}
208
Preamplifier
206
Window Comparator
Pos.
Neg.
212
X1
X4
X2
Low-pass Filter
216
Shaper Discriminator
214
NT
X3
Linear Gate
218
R_i
222
Integrator
220
R_{int}
224
C_{int}
226
Subtractor
+
-
228
X3
Dead Time
Pulse Counter (Neutrons)
230
DC Meter (Gamma)
232
AC

FIG. 9

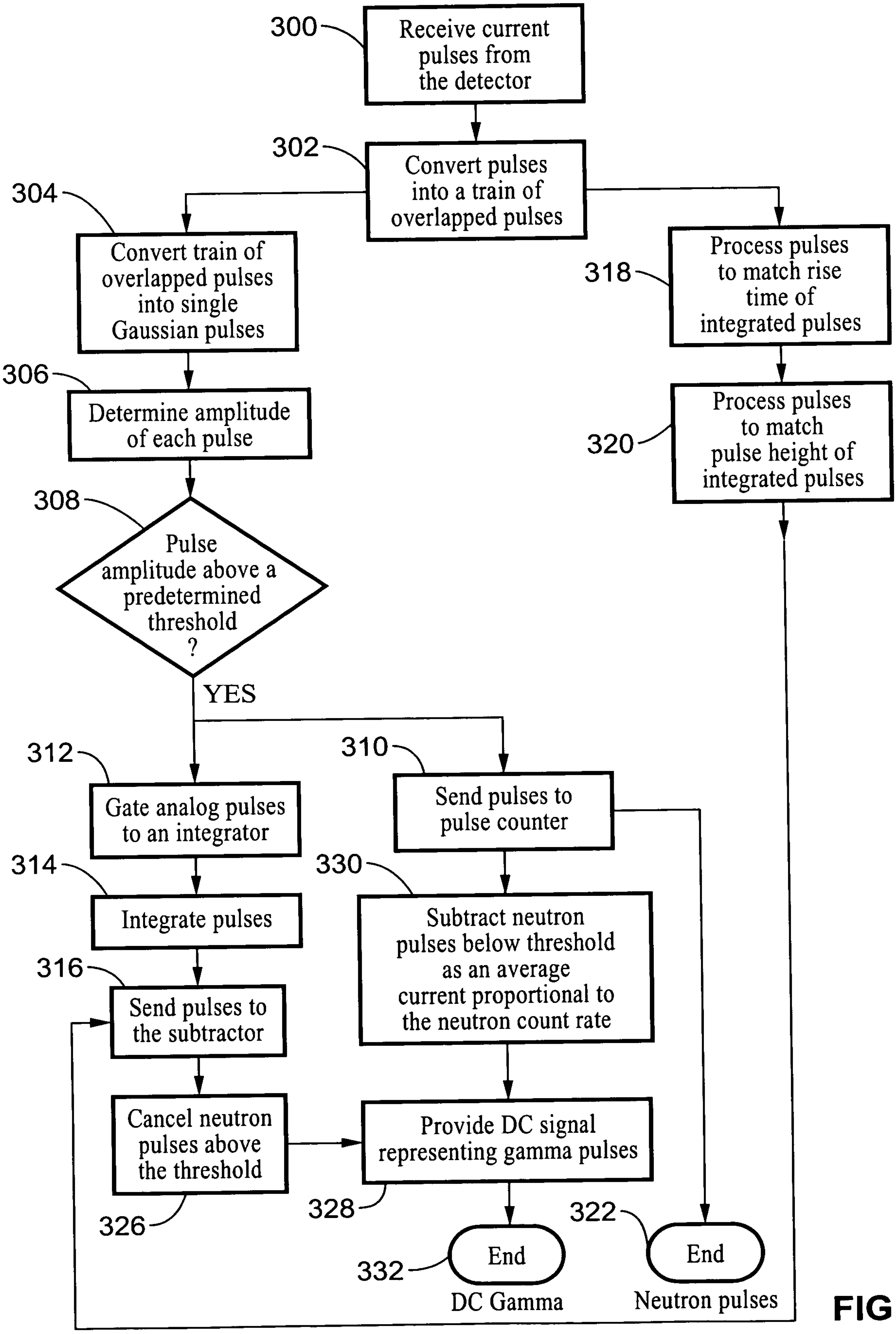
300
Receive current pulses from the detector
302
Convert pulses into a train of overlapped pulses
304
Convert train of overlapped pulses into single Gaussian pulses
306
Determine amplitude of each pulse
308
Pulse amplitude above a predetermined threshold ?
YES
312
Gate analog pulses to an integrator
314
Integrate pulses
316
Send pulses to the subtractor
326
Cancel neutron pulses above the threshold
310
Send pulses to pulse counter
330
Subtract neutron pulses below threshold as an average current proportional to the neutron count rate
328
Provide DC signal representing gamma pulses
332
End
DC Gamma
318
Process pulses to match rise time of integrated pulses
320
Process pulses to match pulse height of integrated pulses
322
End
Neutron pulses

FIG. 10

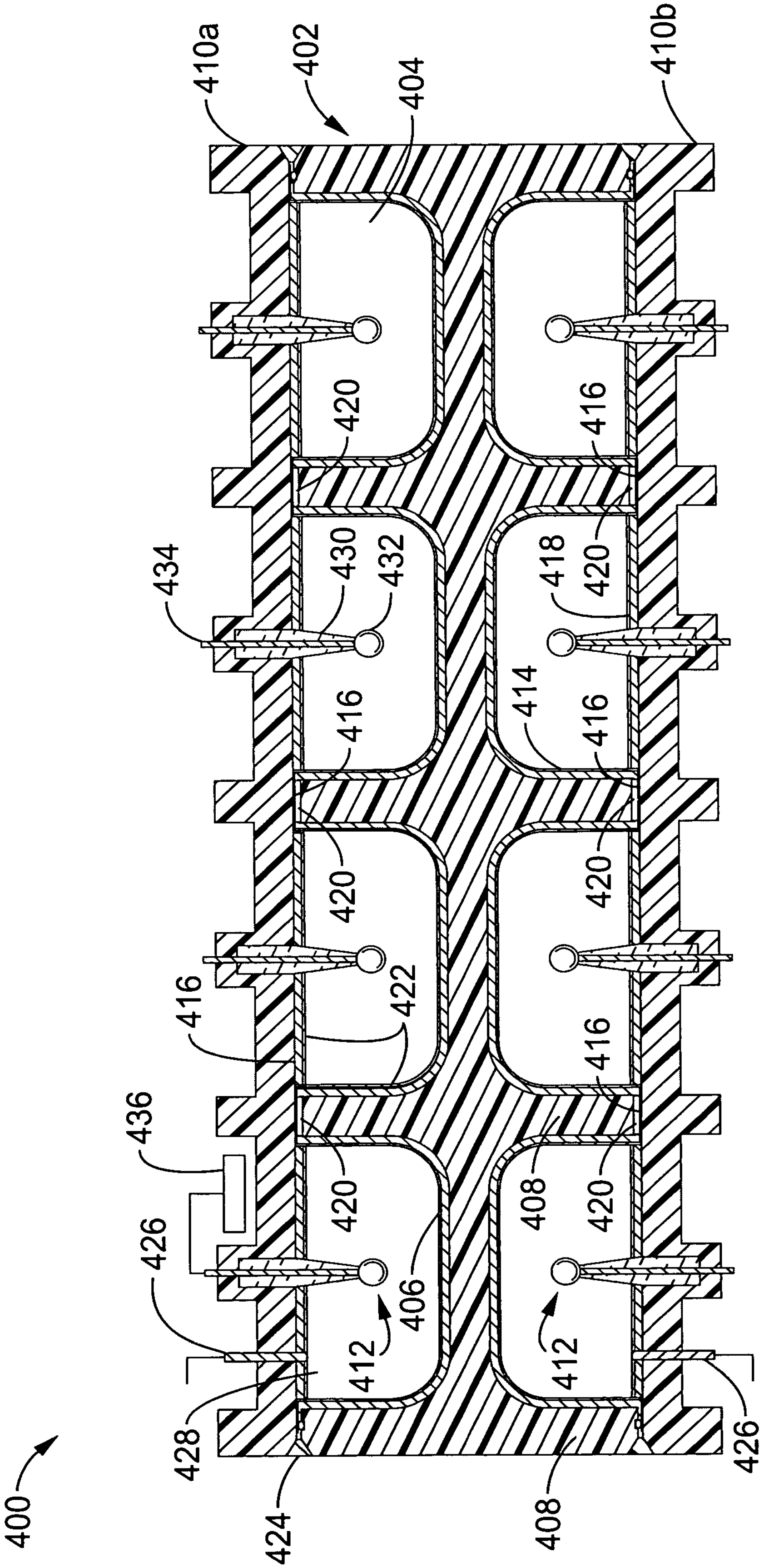

FIG. 11

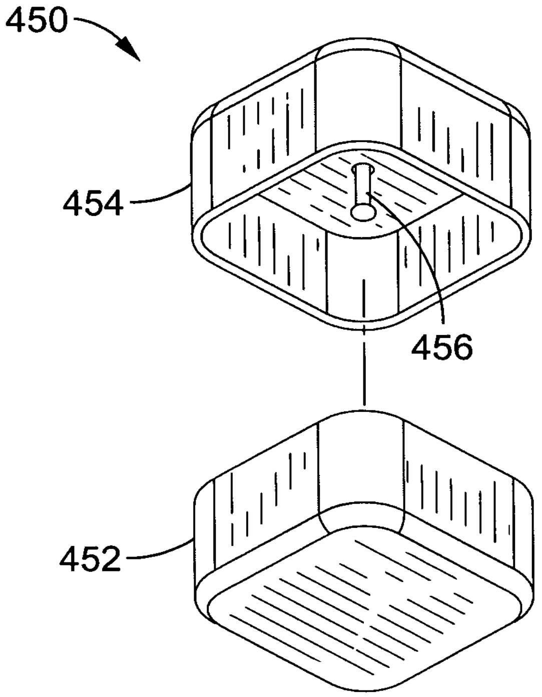

FIG. 12

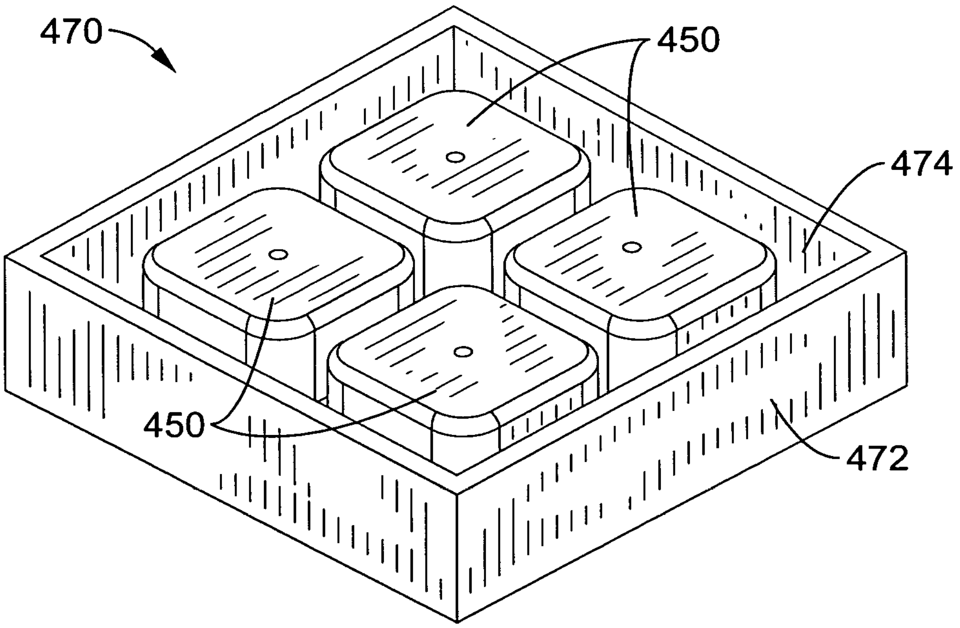

FIG. 13